

Wednesday June 24th

5th Students School on Building Performance Simulation Applications

- Room B1.1.12 (Faculty of Engineering, First Floor of Building B1, NOI TechPark)

Urban Building Energy Modelling and Simulation of Smart Districts

9.00-9.30

Welcome and introduction

Giovanni Pernigotto - Free University of Bozen-Bolzano

Ilaria Ballarini - Politecnico di Torino

9.30-10.15

Deep Learning Methods for Fast and Differentiable Simulation of District Heating Networks

Roberto Boghetti - IDIAP

10.15-10.30

Short Break

10.30-11.15

Towards Climate-Resilient District Heating and Cooling Systems: Dynamic Simulation of Future Scenarios

Vittoria Benedetti & *Alessandro Prada* - University of Trento

11.15-12.00

The Role of Simulation in the Design of Zero-Energy Buildings and Urban Systems

Cesare Forzano & *Annamaria Buonomano* - University of Naples Federico II

12.00-14.00

Lunch Break

14.00-14.45

The Archetype Approach to Urban Building Energy Modelling

Francesco Causone - Politecnico di Milano

14.45-15.30

Analysis of Building Energy Retrofit Scenarios and Urban Microclimates with Urban Energy Models

Jacopo Vivian & *Angelo Zarrella* - University of Padova

15.30-16.30

Round Table on Future Trends and Current Challenges on Urban Simulation

18.30-20.00

Welcome aperitif

- Foyer at the Ground Floor of the Faculty of Engineering (Building B1, NOI Techpark)

Thursday June 25th

- 8.30-9.00 **Participant registration - (NOI TechPark)**
- 9.00-9.15 **Welcome speeches - Seminar Room 1 (NOI TechPark)**
Andrea Gasparella - Free University of Bozen-Bolzano & President of IBPSA-Italy
- 9.15-10.00 **Thursday Keynote Speech - Seminar Room 1 (NOI TechPark)**
Why Correlation Is not Enough: The Case for Causal AI and Human Knowledge in Building Operation
Cheol-Soo Park - Seoul National University
- 10.00-10.30 **Coffee Break**
- 10.30-12.30 **Technical Sessions (in parallel)**
S1.1: Advancing Building Performance Simulation for Decarbonization: Education and Decision-Support Frameworks (chair: Prof. F. Cappelletti, Prof. I. Ballarini) - Seminar Room 1 (NOI TechPark)
- 104 *Educating Future Building Simulation Experts for Decarbonization: A Tool-Based, Multi-Domain Teaching Framework*
Tobias Maile, Davide Dell'Oro, Martin Fischer
- 137 *Teaching Building Performance Simulation in Architecture and Engineering: A Comparative Survey of University Programs*
Christina Hopfe, Veronica Soebarto, Matej Gustin, *Ardeshir Mahdavi*, Robert McLeod
- 195 *Zero-emission buildings: opportunities and limitations of the EPBD recast within a cost-optimal framework in Italy*
Franz Bianco Mauthe Degerfeld, Ilaria Ballarini, *Vincenzo Corrado*
- 125 *Code-Based Data Integration for Early-Stage Circular Building Assessment*
Nigar Novruzova, Orjola Braholli, Dietmar Siegele
- 109 *Financial Investment Strategic Review: Dynamic Thermal Building Simulation Tools at UK Engineering Consultancies*
John Paul Brittle
- 171 *An Energy-Based Evaluation Framework and Performance Simulation Integration Workflow for School Retrofit*
Tao Chen, Long Ao, Zhang Tong
- S1.2: Building Envelope Systems: Materials, Technologies, and Performance (chair: Prof. A. Prada, Prof. G. Evola) - Seminar Room 2 (NOI TechPark)**
- 178 *Phase Change Material (PCM) evaluation in a monitored performance building under hot and humid climate*
João Pedro Martins Pereira, Manuela Furtado Campos, Caio de Carvalho Lucarelli, Nayara Rodrigues Marques Sakiyama, Matheus Menezes Oliveira, Joyce Correna Carlo (presenting: *Iuri Verginio*)
- 152 *Impact Of Cross-Laminated Timber (CLT) Roof Configurations On Building Energy Performance In Cold Climate Regions*
Ayça Akkan Çavdar, Esra Lakot Alemdağ, Nilay Aykan
- 159 *Thermal Performance Assessment of Traditional Timber Lattice Infill Wall Systems (Göz Dolma): A Case Study from the Eastern Black Sea Region of Türkiye*
Nilay Aykan, Esra Lakot Alemdağ, *Ayça Akkan Çavdar*
- 128 *A parametric study on Living wall systems through a novel dynamic code coupled with TRNSYS*
Antonio Cristaudo, Roberto Bruno, Piero Bevilacqua, Francesca Paradisi

- 154 *Transient thermal behavior of building envelopes integrating macroencapsulated phase change materials*
Matias Alvarez-Rodriguez, Luis Tomas Silva, Ines Suarez-Ramon, Mar Alonso-Martinez
- 160 *Acoustics of hydroponic materials*
Gino Iannace, Antonella Bevilacqua, Amelia Trematerra
- 206 *Preliminary Assessment of Temperature Differences in Brick Walls for Thermoelectric Generator Integration*
Michele Libralato, Rasmus Bjørk, Jean-Claude Grivel
S1.3: Modelling of Ventilation, Airflow, and Building-Integrated Systems (chair: Prof. F. Patuzzi, Prof. J. Vivian) - Seminar Room 3 (NOI TechPark)
- 194 *Evaluating Ventilation Rate Determination Methods for Single-Sided Ventilation: A CFD Comparison of Constant Emission and Tracer Gas Decay Approaches*
Philipp Simlinger, Matthias Schuss, Ulrich Pont
- 186 *The effectiveness of different window types for single-sided ventilation*
Matthias Schuss, Ulrich Pont, Dominik Fill, Julia Bachinger
- 161 *Towards Low-Energy Ventilation: Design and Optimisation of a Fixed-Bed CO₂ Adsorption System for HVAC Applications*
Annamaria Buonomano, Gianfranco Cipolla, Cesare Forzano, Robert Maka, Adolfo Palombo, Giuseppe Russo
- 211 *Heat Recovery Potential of Double-Skin Façades: Analytical Modelling and Parametric Study for Bolzano, Italy*
Roshan Raghavendra Rao, Giovanni Pernigotto, Andrea Gasparella
- 129 *Predicting Time-Resolved Air Change Rates for Passive Cooling Using CFD-Based Surrogate Models*
Bernhard Redl, Matthias Schuß, Kristina Orehounig
- 172 *Learned vs. Knowledge-based Causal Masks for Differential Pressure Prediction in a Pharmaceutical Cleanroom*
Hansol Shin, Joa Hyoung Lee, Yoonmee Doh, Taewook Heo
- 132 *Airflow-Based Refinement of Building Simulation Metamodels*
Kahena Marx Silva, Rafael de Paula Garcia, Ligiana Pricila Guimarães Fonseca, Joyce Correna Carlo (presenting: Iuri Verginio)

12.30-13.45

Buffet lunch

13.45-15.30

Technical Sessions (in parallel)

S2.1: HVAC Systems and Thermal Energy Storage: Modelling and Performance Assessment (chair: Prof. M. Noro, Prof. R. Bruno) - Seminar Room 1 (NOI TechPark)

- 131 *A Dynamic Model for Simulation of Inverter Driven Heat Pumps*
Francesco Benà, Jacopo Vivian, Angelo Zarrella
- 142 *TRNSYS-based Simulation of Startup and Defrosting Performance Degradation in Air-to-Water Heat Pumps in an Alpine context*
Fabian Eze, Maja Danovska, Vittoria Benedetti, Alessandro Prada
- 151 *Modelling and Performance Assessment of PCM Thermal Energy Storage in the Energy Retrofit of a Rural Building*
Lorenzo Leoncini, Luca Socci, Anna Pacini, Andrea Rocchetti
- 155 *Borehole thermal energy storage and road solar thermal collector coupled system for heating and cooling of a multiplex cinema in Italy: first numerical results*
Liyang Zhao, Elena Buoso, Riccardo Da Re, Giovanni Giacomello, Amir Maghssudipour, Marco Noro, Giorgia Dalla Santa
- 173 *Experimental Validation of an Optimal Battery-Free Approach for Emission Reduction by Storing Solar Surplus in Building Thermal Mass*
Michela Boffi, Teddy Gresse, Jessica Leoni, Mohamed El Mankibi, Fabrizio Leonforte, Mara Tanelli
- 112 *Analytical Model (SAM 3.0): New approach to automated HVAC Simulation*
Michal Dengusiak, Jakub Ziolkowski, Michalina Dengusiak

S2.2: BIM-Based Workflows and Interoperability for Building Performance Simulation (chair: Prof. A. Gasparella, Prof. B. Nagy) - Seminar Room 2 (NOI TechPark)

- 115 *Beyond the File Format: Navigating the Topological Complexity of BIM-to-BEM Data Ecosystems*
Pouria Elahi, Carlos Martinez, Marie-Claude Dubois, Pieter de Wilde
- 145 *How is AI adopted within three pillars of an integrated Digital Platform for energy analysis in the built environment?*
Lorenzo Villani, Laura Pompei, Daniele Groppi, Davide Astiaso Garcia
- 165 *Feasibility study to evaluate HBIM-to-BPS interoperability for the geometric representation of historical buildings*
Letizia Martinelli, Beatrice Bartolucci, Alessandro Calif Ben, Elena Verticchio, Cristina Cornaro, Filippo Calcerano
- 197 *Open BIM and Clash Detection as Tools for Analyzing MEP Interferences and Preventing Environmental Risks*
Mohsen Zavari, Costantino Carlo Mastino, Andrea Frattolillo, Emanuela Quaquero, Eleonora Congiu, Gavina Baralla, Valerio Da Pos
- 146 *Bridging the performance gap in Large-Panel System (LPS) retrofits: a BIM-integrated thermal assessment workflow*
Balázs Fürtön, Balázs Nagy
- 179 *Assessment of BIM-based dynamic simulation for preliminary energy analysis of a large building complex: a case study from Italy*
Monika Pendaroska, Alex Gallo, Michele De Carli

S2.3: Calibration, Validation, and Modelling Challenges in Historic Building Simulation (chair: Prof. Vincenzo Corrado, Prof. P. Bevilacqua) - Seminar Room 3 (NOI TechPark)

- 167 *Calibration and validation approach using AutoMOO in IDA ICE: a dynamic energy simulation case-study at University of Rome Tor Vergata*
Beatrice Bartolucci, Gianluigi Bovesecchi, Alessia Bocci, Cristina Cornaro
- 181 *Dynamic energy simulation based on realistic and standard-based material characterization*
Fanni Petresevics, Levente Szatmári, Balázs Nagy
- 157 *A Calibration-oriented Workflow of Ground-Coupled Basement Hygrothermal Models using Long-Term Monitoring Data*
Simone Panico, Sana Fatima Ali, Annamaria Belleri, Daniel Herrera, Alexandra Troi
- 153 *A Data-Driven Calibration Method for Estimating Air Change Rates in Naturally Ventilated School Buildings*
Ana Paola Rocca Vera, Alice Bolzan, Paola D'Agaro
- 156 *Numerical and experimental analyses towards energy efficiency strategies for heritage buildings: a case study in central Italy*
Adriana Ciardiello, Veronica Lucia Castaldo, Maria Francesca Talamo, Lorenzo Croci, Cristina Cavicchioni, Franco Cotana
- 163 *Impact of geometric simplifications in historic building energy simulation: the role of thermal zoning and geometric representation*
Zhiyuan Xin, Harold Enrique Huerto-Cardenas, Fabrizio Leonforte, Claudio Del Pero, Niccolo' Aste

15.30-16.00 **Coffee Break**

16.00-18.00 **Technical Sessions (in parallel)**

S3.1: Students competition (chair: Students Tutoring Scientific Committee) - Seminar Room 1 (NOI TechPark)

- 101 *Inverse design optimization for building EUI targets: Generating interpretable design alternatives*
Jeeye Mun, Cheol-Soo Park
- 103 *Counterfactual Simulation of Occupant Behavior and Cooling Energy Use in Residential Buildings Using a Causal AI Model*
Sunghyun Kim, Cheol-Soo Park
- 114 *A centralized DHW system with multiple storage devices: dynamic simulations to define sizing criteria and control logic*
Michele Torrisi, Gianpiero Evola, Vincenzo Costanzo

- 127 *Solar seasonal energy storage to achieve PED configurations in temperate climates*
Francesca Paradisi, Piero Bevilacqua, Roberto Bruno, Antonio Cristaudo
- 139 *Cluster-based microclimate analysis for the dynamic simulation of multi-room archival facilities: application to a cinematographic archive*
Marianna Bourgioti, Francesca Frasca
- 183 *Climate Resilience of Italian Residential Buildings: Energy Performance and Summer Indoor Thermal Comfort under SSP Scenarios*
Giacomo Sarti, Gianluca Maracchini, Rossano Albatici
S3.2: IEQ and Occupant-Centric Modelling: From Monitoring to Simulation and Control (chair: Prof. F. Cappelletti, Prof. M. Schuss) - Seminar Room 2 (NOI TechPark)
- 102 *From post-occupancy data to building simulation: developing resilient schedules for social housing*
Linda Toledo, Annamaria Belleri
- 190 *From sensors to decisions: interpreting indoor environmental monitoring for smarter buildings*
Laura Carnieletto, Wilmer Pasut
- 118 *Integrating a health-based metric into indoor temperature simulation of a residential unit*
Gioberti Morantes, Sana Fatima Ali, Linda Toledo, Giulia Paoletti, Akshit Gupta, Francesco Babich, Annamaria Belleri
- 166 *Scoping an overheating assessment in low-energy housing under the Italian KlimaHaus standard*
Linda Toledo
- 192 *Optimizing Single-Sided Ventilation through Window Operation Strategies: A CFD-Validated Study on Purge versus Continuous Slot Ventilation for Balancing Indoor Air Quality and Thermal Comfort*
Philipp Simlinger, Matthias Schuss, Ulrich Pont
- 193 *Ventilation Behaviour and Moisture Risk in Residential Buildings: A Dynamic Simulation Study*
Matthias Schuss, Hanna Weltken, Dominik Fill, Ulrich Pont
- 18.00-18.45** **IBPSA Italy General Meeting - Aula Magna (NOI TechPark, Faculty of Engineering, B1 building)**
- 18.00-19.00** **Transportation to the city center**
- 20.00-20.30** **Evening Lecture - Castel Mareccio / Schloss Maretsch**
Andrea Gasparella - Free University of Bozen-Bolzano
- 20.30-22.30** **Conference dinner at Castel Mareccio / Schloss Maretsch**

Friday June 26th

8.45-9.30 Friday Keynote Speech - Seminar Room 1 (NOI TechPark)

Prediction and evaluation of perceived indoor-environmental quality: Is the glass half full or half empty?

Ardeshir Mahdavi - TU Graz

9.30-11.00 Technical Sessions (in parallel)

S4.1: Urban Building Energy Modelling and Simulation (chair: Prof. F. Patuzzi, Prof. L. Carnieletto) - Seminar Room 1 (NOI TechPark)

202 *CitySim against DESTEST: a validation of Building and District Heating Network simulation*
Dubon Rodrigue, Jerome H. Kaempf

207 *Integrating EPC Distributions and 3DCityDB for Scalable Urban Building Energy Modeling*
Gregorio Borelli, Andrea Gasparella, Giovanni Pernigotto, Jérôme Henri Kämpf

126 *Comparative study on shape similarity for urban-scale building footprint typology*
Hye-Gi Kim, Han-Gyeong Chu, Dong Hyuk Yi, Deuk-Woo Kim

136 *A simplified surface energy balance model informed by satellite imagery for urban-scale simulations*

Naila Naila, Giacomo Tognon, Michele DeCarli, Jacopo Vivian

138 *A GIS-based Plugin for Enhancing Air Change Rates in Urban Building Energy Modeling*
Xuan Zhou, Yasemin Usta, Guglielmina Mutani

S4.2: Climate Impacts, Weather Data, and Resilience in Building and Urban Performance (chair: Prof. I. Ballarini, Dr. M. Libralato) - Seminar Room 2 (NOI TechPark)

100 *Comparative Study between Measured and Simulated Solar Irradiation in Topographically Diverse Regions for BEM Application*

Alen Hausmeister, Jošt Rogelj, Atlas Ramezani, Katja Malovrh Rebec

164 *The Impact of Local Weather Data on Energy Modelling of alpine Buildings*
Francesca Gadusso, Graziano Salvalai, Martin Hauer

140 *Indoor thermal comfort under climate change and heat waves in mountainous Friuli Venezia Giulia: Archetype residential building analysis*

Atlas Ramezani, Marco Manzan

205 *Climate-Resilient Strategies for Urban Heat Island Mitigation Using Representative Urban Blocks*
Matteo Piro, Mamak P. Tootkaboni, Gregorio Borelli, Ilaria Ballarini, Vincenzo Corrado

191 *Assessing the long-term resilience of green facades under future climate scenarios in tropical buildings*

Camila Borges, Érica Pagel

S4.3: Data-Driven and AI Methods for Building Performance Simulation (chair: Prof. A. Prada, Prof. G. Evola) - Seminar Room 3 (NOI TechPark)

113 *Quantification of Influences on Artificial Lighting Energy Demand using High-Performance Computing-Supported Multivariate Simulations*

Sascha Hammes, Johannes Wenginger, David Geisler-Moroder, Philipp Gschwandtner, Philipp Zech

133 *Application of machine learning models trained with simulated data for indoor temperature estimation in a monitored building*

Murillo Borges, Iuri Verginio, Rafael Garcia, Joyce Carlo

144 *Comparison of correlation-based and causal models Informed by causal discovery for building energy data*

Han-Gyeong Chu, Hye-Gi Kim, Deuk-Woo Kim

- 111 *Curated Intelligence for visual inference and deterministic logic toward automatic BEM*
Tae Yong Song, Jin-Hong Ki, Seung-Ju Lee, Soo-Kyung Kim, Hyun Cheol Park, Kyung Jae Kim, Cheol-Soo Park
- 143 *Worldwide ROMs: Enhancing the Scalability of RC models for Urban Applications*
Gianfranco Cipolla, Giovanni Pernigotto, Cesare Forzano, Annamaria Buonomano, Andrea Gasparella
- 11.00-11.30** **Coffee Break**
- 11.30-13.00** **Technical Sessions (in parallel)**
- S5.1: Energy Demand, Electrification, and System-Level Modelling in Buildings and Districts (chair: Prof. A. Buonomano, Prof. V. Benedetti) - Seminar Room 1 (NOI TechPark)**
- 130 *Five-year analysis of natural gas consumption for heating in residential buildings in the city of Padova*

Alessio Tollin, Jacopo Vivian, Angelo Zarrella
- 177 *Input prioritization under building data constraints: a scenario-based assessment of electricity demand modelling for renewable energy community*
Yunxi Zhu, Graziano Salvalai
- 204 *Simulating Impacts of Future Buildings Electrification: New York City's Energy Grid Case*
Jorge Gonzalez-Cruz
- 175 *Impact of Load-Profile Temporal Resolution on BIPV Energy and Economic KPIs: A Typical Small Multi-Family Residential Building across Five European Climates*
Arash Maher, Maryam Fakhari, Francesco Causone, Laura Maturi
- 134 *Optimization Framework for Building Geometry Simplification Based on Solar Radiation Profiles in Urban-Scale Modeling*
SungHo Yoo, Donghyuk Yi
- S5.2: Machine Learning, AI and Advanced Controls in Building Performance Simulation (chair: Prof. G. Pernigotto, Prof. C. Forzano) - Seminar Room 2 (NOI TechPark)**
- 135 *Assessment of the energy flexibility of non-residential buildings: case study of a University building*

Giacomo Tognon, Virgilio Molon, Jacopo Vivian
- 210 *Physics-Guided Neural Networks vs. Resistor-Capacitor Baselines for Model Predictive Control: A preliminary comparison*
Andreas Völser, Giovanni Pernigotto, Andrea Gasparella
- 162 *Model Predictive Control of a Hybrid Heating System for a Theatre in the Netherlands*
Ved Dubhashi, Andries van Wijhe
- 106 *Uncertainty Propagation from Building Simulation Codes to Performance-Based Weather Files*
Mario Alves da Silva, Giovanni Pernigotto, Andrea Gasparella
- V5.3: Video presentation recordings**
- 110 *Expansive Architecture: Incremental and Kinetic Strategies for the Enlargement and Adaptation of Architectural Modules*
Otavio Moraes de Castro, Bruno Massara Rocha
- 120 *Simulation-Based Decision Support for Energy Retrofit of Historic Buildings under Heritage Constraints*

Behnaz Alizadehmajd
- 13.00-13.30** **Student Award and closing ceremony - Seminar Room 1 (NOI TechPark)**
- 13.30-14.30** **Buffet lunch**
- 15.00-16.00** **Visit to Building Physics Labs at the NOI TechPark (optional)**